UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/692,154	10/22/2003	Ching-Yu Hung	TI-35348	9150

23494 7590 01/23/2008
TEXAS INSTRUMENTS INCORPORATED
P O BOX 655474, M/S 3999
DALLAS, TX 75265

EXAMINER	
WANG, CLAIRE X	
ART UNIT	PAPER NUMBER
2624	

NOTIFICATION DATE	DELIVERY MODE
01/23/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

uspto@ti.com
uspto@dlemail.itg.ti.com

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/692,154
Filing Date: October 22, 2003
Appellant(s): HUNG ET AL.

Carlton H. Hoel (Reg. No. 29,934)
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 09/12/2007 appealing from the Office action mailed 04/19/2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeal and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,466,333	Schoolcraft et al.	10-2003
6,049,400	Vondran, Jr.	4-2000
4,275,413	Sakamoto et al.	6-1981
6,697,520	Hemingway	2-2004

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-6 are rejected under 35 U.S.C. 102(b) as being anticipated by Schoolcraft et al. (US 6,466,333 B2).

As to claim 1, Schoolcraft et al. (from this point forward shall be referred to as Schoolcraft) teaches a method of tetrahedral interpolation (Col. 1, lines 8-11), comprising the steps of: (a) receive a color space input point (pixel of the input image; Col. 11, line 43); (b) compute a base point (base address; Col. 11, line 58) and three differentials (Col. 11, lines 65-67; Col. 12, lines 1-3)) for said input point; (c) compare said three differentials (Table V); (d) compute tetrahedron vertices from the results of steps (b) and (c) (Table V), a first one of said vertices being said base point (look-up table 34; Col. 6, lines 30-32); (e) find output values for each of said vertices (Table I; Col. 6, lines 34-59); (f) compute an interpolated output value for said input point as the sum of the output value of said base point plus the inner product of said differentials in

size order with corresponding differences of said output values for said vertices (Table III).

As to claim 2, Schoolcraft teaches wherein: (a) said output values of step (e) are a single color value for each vertex (look-up table 34 has a cube output representing each input; a cube has 8 vertices and therefore can use one of its vertices to represent an input value; Col. 6, lines 4-10 and lines 23-28).

As to claim 3, Schoolcraft teaches wherein: (a) said output values of step (e) are three color values for each vertex (look-up table 34 has a cube output representing each input; a cube has 8 vertices and therefore can use three of its vertices to represent an input value; Col. 6, lines 4-10 and lines 23-28).

As to claim 4, Schoolcraft teaches wherein: (a) said output values of step (e) are four color values for each vertex (look-up table 34 has a cube output representing each input; a cube has 8 vertices and therefore can use four of its vertices to represent an input value; Col. 6, lines 4-10 and lines 23-28).

As to claim 5, Schoolcraft teaches wherein: (a) said output values of step (e) are six color values for each vertex (look-up table 34 has a cube output representing each input; a cube has 8 vertices and therefore can use all 8 of its vertices to represent an input value; Col. 6, lines 4-10 and lines 23-28).

As to claim 6, it differs from claim 1 only in that claim 1 is a method claim whereas claim 6 is the system of claim 1. Thus claim 6 is analyzed previously discussed as respect to claim 1 (Fig. 1 shows the system Schoolcraft's invention).

(10) Response to Argument

1. The following discussion relates to the rejection of claims 1-6 under 36 U.S.C. 102 (b) as being anticipated by Schoolcraft ET al. (6,466,333)

A1. Appellant's argument:

i. The appellant argues (page 4 of the Appeal Brief) "Schoolcraft Table III does not suggest an inner product of the differentials in size order with the corresponding differences of vertex outputs. Rather, Table III just lists the six possible relative sizes of the three differentials and the corresponding interpolation in terms of an inner product of differences of differentials with vertex outputs; that is, Table III has difference of differentials, whereas the claim is differences of vertex outputs."

A2. Examiner's response:

i. The Examiner respectfully disagrees with the Appellant's argument due to the following reasons:

(1) Examiner would like to present Table III of Schoolcraft et al.

TABLE III

Conditional statements and corresponding equations for tetrahedral interpolation.

Conditional Statement	Interpolation Equation
if dz ≧ dy > dx (P is in tetrahedron 41) then	V = [(dx)V0 + (dy – dx)V3 + (dz – dy)V1 + (16 – dz)V7]/16
if dy > dx > dz (P is in tetrahedron 42) then	V = [(dz)V0 + (dx – dz)V6 + (dy – dx)V2 + (16 – dy)V7]/16
if dy > dz ≧ dx (P is in tetrahedron 43) then	V = [(dx)V0 + (dz – dx)V3 + (dy – dz)V2 + (16 – dy)V7]/16
if dx ≧ dz > dy (P is in tetrahedron 44) then	V = [(dy)V0 + (dz – dy)V5 + (dx – dz)V4 + (16 – dx)V7]/16
if dz > dx ≧ dy (P is in tetrahedron 45) then	V = [(dy)V0 + (dx – dy)V5 + (dz – dx)V1 + (16 – dz)V7]/16
if dx ≧ dy ≧ dz (P is in tetrahedron 46) then	V =[(dz)V0 + (dy – dz)V6 + (dx – dy)V4 + (16 – dx)V7]/16

it is noted that each interpolation equation corresponds to a conditional statement. V represents an output color component value (e.g., C, M or Y value) at point P, and V0 through V7 represents the corresponding entry (e.g., C, M or Y value) in look-up table 34 for points P0 through P7 (Col. 7, lines 61-65).

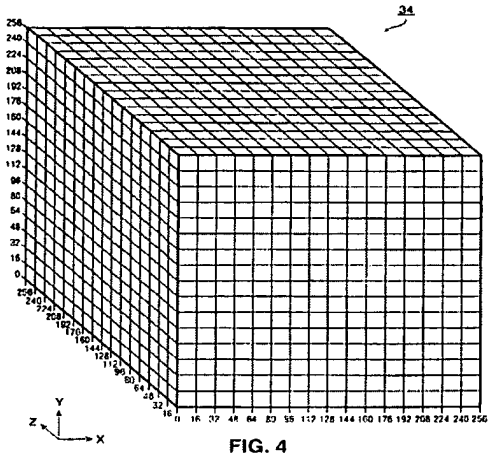

FIG. 4

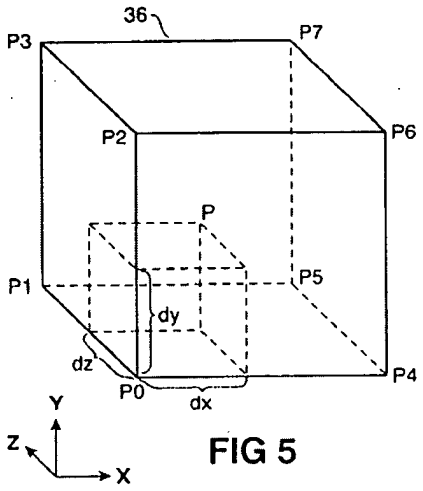

FIG 5

This reads on the claimed "size order" of claims 1 and 6, since size order may be in any order according to the differential's size. Table III clearly shows the different possibilities of dx, dy, and dz. For example, if dz >= dy > dx then there is a corresponding interpolation equation associated with the condition. The language of claims 1 and 6 do not mention that size order need to be from large to small, small to large, or any other possible combinations; it simply states "size order".

(2) It is noted that Schoolcraft teaches the interpolation equations produces vertex outputs. In Fig. 6, Schoolcraft clearly demonstrates examples of tetrahedral interpolations where vertices are in use.

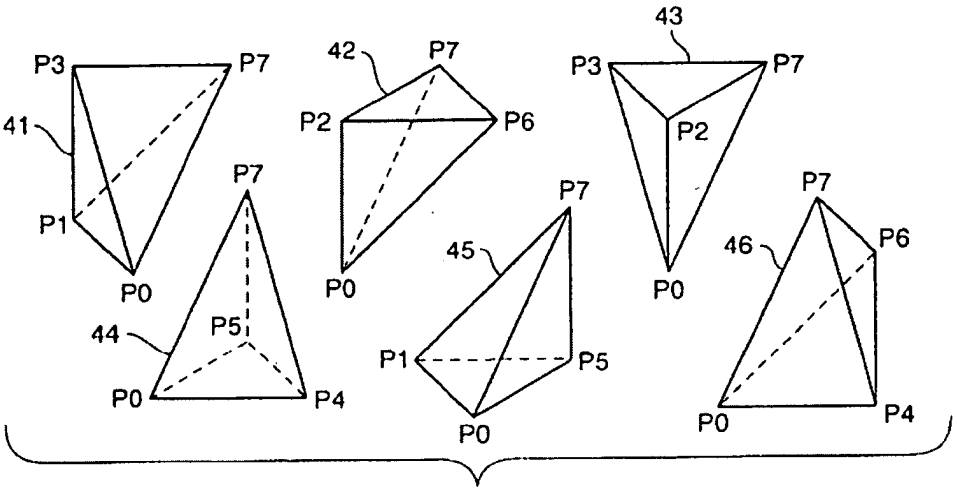

FIG 6

Note that P0-P7 are the same vertices listed in Fig. 5, shown in the above argument. Schoolcraft also teaches "the output color component values are calculated by weighting the entries in look-up table 34 that correspond to the appropriate tetrahedron by the distances of the input color component values from the vertices of the tetrahedron." (Col. 7, lines 53-56)

B1. Appellant's argument:

i. The appellant argues "the computation of Schoolcraft; namely,

$$V = [(dx)V0 + (dy\ \ dx)V3 + (dz\ \ dy)V1 + (16\ \ dz)V7]/16$$

Could be rearranged to look like the claim 1 inner product; namely,

$$V = dx(V0\ \ V3)/16 + dy(V3\ \ V1)/16 + dz(V1\ \ V7)/16 + V7$$

However, this is no surprise: Schoolcraft and claims 1 and 6 both perform tetrahedral interpolation and thus have to get the same answer. But claims 1 and 6 are directed to the method of computing the interpolation; and the Examiner's rearrangement is just hindsight." (see Pages 4-5 of Appeal Brief)

B2. Examiner's response:

i. The Examiner respectfully disagrees with the Appellant's argument due to the following reasons:

(1) Examiner would like to direct attention to Appellant's two equations (pages 4-5 of Appeal Brief), namely,

$$V = [(dx)V0 + (dy\ \ dx)V3 + (dz\ \ dy)V1 + (16\ \ dz)V7]/16$$

converting to:

$$V = dx(V0\ \ V3)/16 + dy(V3\ \ V1)/16 + dz(V1\ \ V7)/16 + V7$$

The above two equations are not mathematically equivalent to each other. The actual equation the Examiner quoted from Schoolcraft's teachings is:

$V = [(dx)V0 + (dy - dx)V3 + (dz - dy)V1 + (16 - dz)V7]/16$

Which may be rearranged to look like the following using simple math:

$V = dx\ (V0 - V3)/16 + dy\ (V3 - V1)/16 + dz(V1 - V7)/16 + V7$

(2) Schoolcraft's invention is directed towards tetrahedral interpolation by which an interpolated color output value is interpolated from values in a color look-up table based on a color input value (Col. 1, lines 8-11). This is a method for tetrahedral interpolation which requires computing the interpolation equations. Thus it is in the same direction as the claimed invention.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Claire X. Wang

Conferees:

Matthew Bella (SPE)

MATTHEW C. BELLA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

Jingge Wu (SPE)

JINGGE WU
SUPERVISORY PATENT EXAMINER